



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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ENFORCEMENT &
COMPLIANCE ASSURANCE
DIVISION

March 9, 2022

Mark Larsen
Project Coordinator
ANCHOR QEA, LLC
1119 Pacific Avenue, Suite 1600
Tacoma, Washington 98402

Re: Bosma Dairy Lagoons 1, 2, and 3
Administrative Order on Consent ("Consent Order")
Docket No. SDWA-10-2013-0080
Yakima Valley Dairies, Washington

Dear Mr. Larsen:

EPA has completed our review of:

- H&S Bosma Dairy Lagoon No. 3 Abandonment Plan ("Plan") (January 18, 2022)

Lagoon 3 was required to be lined by the end of 2021 and is now behind schedule. EPA has informed Respondent that they are at risk of stipulated penalties regarding sampling, plan submittal, and completion of field work regarding Lagoon 3. The Bosma Dairy ("Respondent") has proposed to abandon Lagoon 3 instead of lining it. Because the Bosma Dairy has also proposed to abandon nearby Lagoons 1 and 2 in 2022, the comments in this letter pertain to Lagoons 1, 2 and 3, should Respondent elect to continue its stated plans to abandon, rather than line, these lagoons.

The soil sampling results collected by Respondents and provided in Table 2 of the Plan show heavy nitrogen soil contamination beneath Lagoon 3 to a depth of 10 feet. EPA is concerned that in its current condition, Lagoon 3 may represent an imminent and substantial endangerment to the drinking water aquifer and downgradient residential drinking water wells. Any surface water that is allowed to infiltrate the bottom or sides of Lagoon 3 (e.g., rainwater, snowmelt) will likely migrate through the contaminated soil and transport nitrate to the drinking water aquifer. Respondent's failure to close Lagoon 3 by December 31, 2021 may delay the development of downward nitrate trends in monitoring wells DC-03 and DC-03D, which appear to be downgradient of the lagoon.

In accordance with Consent Order Paragraph 14, EPA is hereby revising the Lagoon 3 construction schedule to include an interim measure to protect human health --- Respondent must regrade the bottom of the lagoon, install two or more sumps with pumps that are constantly powered and functional such that ponding does not occur, and discharge to a lined lagoon or agronomically managed field. Respondent must maintain the drainage controls until Respondent receives approval from EPA. This addition does not alter or extend any other due dates regarding the Lagoon 3 construction schedule.

Respondent has a poor record of compliance with the Consent Order regarding lagoons that Respondent has elected to abandon rather than line. To date, the lagoons proposed for abandonment in past years (Bosma Lagoons 3, 8, 9, 18, 19, 20) have not been abandoned in accordance with EPA-approved plans and schedules, and EPA is concerned that these failures have increased the risk of further contamination of the drinking water aquifer and downgradient residential wells and have likely contributed to delay in achieving downward nitrate trends in groundwater monitoring wells that are downgradient of these lagoons.

Based on our review of the Plan, EPA has these comments:

General Comments

1. **Respondent must clearly demonstrate in the Plan that sufficient lagoon storage capacity will remain at the Bosma/Liberty Dairy Facility after the abandonments of Lagoons 1, 2, and 3. If Respondent does not make this demonstration, then Lagoons 1, 2, and 3 must be lined.** Modify the Plan to include Lagoons 1 and 2. Provide an analysis that specifically and numerically demonstrates that the Liberty/Bosma Dairy will have sufficient, overall lagoon storage capacity (in gallons) for the entire combined Dairy Facility if Lagoons 1, 2, and 3 were to be abandoned. The analysis must show all relevant facts and calculations and include:
 - a. a numerical estimate in gallons of the total amount of liquid animal waste generated annually by the facility based on the numbers and types of animals currently kept at the Liberty/Bosma Dairy Facility.
 - b. a statement of the number of winter months requiring lagoon storage.
 - c. an estimate of the total amount of liquid waste in gallons that is required to be stored during the winter months.
 - d. a list of the lagoons at the Liberty/Bosma facility and the “final” storage capacity of each, excluding Lagoons 1, 2, and 3.
 - e. a direct numerical comparison of the total amount in gallons required to be stored to the total cumulative volumetric capacity of the lagoon system (also in gallons) with the capacities of Lagoons 1, 2 and 3 omitted.
2. Respondent’s Lagoon 3 soil sampling results provided in Table 2 show deep and heavy nitrogen soil contamination beneath this lagoon to a depth of 10 feet in two sampling locations. Respondent did not sample deeper than 10 feet, and soil contamination may extend deeper, possibly to the drinking water aquifer. Lagoons 1 and 2 may have been similarly dug into porous soils and may have similar deep soil contamination.
3. Paragraph 20.b of the Consent Order states:

“Where any action under this Consent Order is to be performed in areas owned by or in possession of someone other than Respondents, Respondents shall use best efforts to obtain all necessary access within the time period specified in the SOW. Respondents shall immediately notify EPA if after using its best efforts it is unable to obtain such access. Respondents shall describe in writing their efforts to obtain access.”

Respondent has stated that deep excavation of the contaminated soils beneath the lagoon is not feasible because the irrigation district would not grant access. However, the lagoon is not on the irrigation district’s property. In the Plan, in accordance with Consent Order Paragraph 20,

describe in detail why access from the irrigation district would be necessary to conduct the excavation, and your efforts to date to obtain access. You mentioned an irrigation district pipe that runs near the lagoon. Show the location of the pipe in a figure, describe the pipe in the body of the report, its capacity, purpose, its past and current use, and whether it could be relocated, temporarily or otherwise, to allow excavation. Describe any other concerns regarding conducting deep excavation with respect to irrigation district concerns or assets, and how each could be mitigated.

4. The proposed in-place bioremediation plan is unacceptable because trees would allow leaching through contaminated soils during treatment, it does not fully characterize the depth of contamination, and it may be unsuccessful in removing enough nitrogen in a timely fashion to be protective of groundwater and residential wells. Revise the plan so that it requires:
 - Excavation of all soils that do not meet the target cleanup criteria (using, for example, a trench box), filling of the lagoon with clean, off-site soils, and grading the surface to direct surface water off and away from the former lagoon.

If EPA agrees that Respondent has exhausted efforts (see general comment #3 above) to obtain access to implement the above option, and if EPA agrees that the above option is not practicable to implement, then Respondent, then Respondent may consider proposing these options to EPA:

- Excavation of as much contaminated soil as practicable, and then filling the lagoon with clean, off-site material, grading the surface to direct runoff off and away from the former lagoon, and capping the former lagoon with a flexible membrane liner (FML) to prevent infiltration; or
 - Excavation of as much contaminated soil as practicable, implementation of a subsurface remediation technology that will rapidly treat nitrogen contamination *in situ* at depth, confirmation sampling to demonstrate compliance with the cleanup target at depth, filling of the lagoon with clean, off-site soils, and grading the surface to direct surface water off and away from the former lagoon.
5. The plan must include a final contour drawing with labeled contours of the filled lagoons and the area around the lagoons to show how runoff will be directed away from the lagoons, not allowed to pool nearby, and the destination of the runoff from all three lagoons. The elevation of the contour lines must be labeled in feet above mean sea level.
 6. The nitrogen target we have been using, the sum of nitrate plus ammonium must be below 45 ppm, is specific to agronomic management of application fields. That nitrogen target may not be suitable for abandoning lagoons with elevated nitrates extending deep into the vadose zone. Subsurface ammonia or organic nitrogen will also likely convert to nitrate and migrate to the drinking water aquifer. The plan must state a soil nitrogen requirement for Lagoons 1, 2, and 3 using a total nitrogen (nitrate + nitrite + ammonium + ammonia + organic N) target below 45 ppm. Respondent's revised plan must provide for continuously sampling soils at one-foot intervals until the target soil nitrogen target is attained, using a split spoon sampler or other appropriate equipment.¹

¹ If Respondent archived the Lagoon 3 samples, Respondent may re-analyze the archived samples as part of the analysis for Lagoon 3.

7. Clarify the geology beneath the lagoons and depth to groundwater by adding a figure showing a geologic cross-section of Lagoons 1, 2, and 3 along a north-south axis, including elevation, the vadose zone soil types, and the water table, based on available cross-sectional information. For reference, see, for example, Figure 6 in the 2018 Groundwater Monitoring Report, cross-sections A to A', B to B', and G to G', which are near the three lagoons. Supplement existing information with lithologic information from the test pits.
8. Add a detailed plan for managing excavated soils that:
 - a. specifies the specific location(s) where the soils will be staged immediately after removal. The location(s) must be an impermeable surface, or at a minimum, on a composting area where the soil has been compacted in accordance with the Dairy's Consent Decree.
 - b. If Respondent plans to apply the soils to their or other crop fields, describe plans to sample the soils before application, sample the receiving field(s), and ensure application at agronomic rates.
9. The Plan must state that any soils that are to be used as fill material for backfilling the lagoons must be clean. Provide a plan for sampling the fill materials to ensure they are not contaminated with nitrogen.
10. Add this sentence to the Report: "Crop production on the locations of these lagoons can occur only if all subsurface soils that do not meet the soil cleanup criterion have been removed. If Respondent is interested in planting crops with the footprints of the former lagoons, Respondent will submit a crop plan to EPA after the closure reports are approved by EPA. No crops will be planted within the former lagoon locations prior to EPA approval of the crop plan." Modify or delete any text in the Report that conflicts with or is inconsistent with this statement.
11. Add this sentence: "Work associated with these lagoons will not result in the creation of any new open earthen lagoons, pits or holes on Respondents' properties."

Specific Comments

1. Figure 2 shows approximate existing contours but is small and does not show the elevations of any of the contour lines. Add a new figure showing an enlarged Lagoon 3 contour map with each contour line elevation labeled in units of feet above mean sea level.
2. Section 1- Introduction. Delete the sentence, "As part of lagoon abandonment, the lagoon will be regraded to support crop production." Replace it with, "The lagoon shall be graded to prevent ponding on the former surface of the lagoon, such that runoff from the area of the lagoon is conveyed to uncontaminated areas."
3. Section 2 – Existing Conditions.
 - a. Delete the sentence, "The lagoon was originally created within a natural depression in the

topography, bounded by Kirks Road and the Sunnyside Canal (owned by the Sunnyside Valley Irrigation District [SVID]), with the addition of earthen berms at the southern ends of what would become Lagoon No. 3.” Replace it with, “The lagoon was originally dug into a historical creek bed and is adjacent to an irrigation district “drain” canal that follows the historical creek. The lagoon is bounded by Kirks Road and the Sunnyside Canal (owned by the Sunnyside Valley Irrigation District [SVID]), with the addition of earthen berms at the southern ends of what would become Lagoon No. 3.”

- b. Delete, “Lagoon No. 3 has historically been used to store stormwater runoff and manure waste generated from Dairy operations.” Replace with, “For the purposes of the Consent Order, the term “lagoon” includes animal waste lagoons, and animal waste management or storage ponds. Lagoons 1, 2 and 3 have historically served as animal waste storage ponds that contained runoff from land areas contaminated with animal waste and waste liquids from processing operations.”

Pursuant to Paragraph 14 of the Consent Order, Respondents must address these comments in the Plan for Bosma Lagoons 1, 2, and 3 and resubmit the unified Plan to EPA no later than April 15, 2022.

This letter also responds to your December 31, 2021, letter regarding the proposed schedule for abandoning Bosma Lagoons 1 and 2. Your proposed schedule regarding these lagoons is not acceptable because it proposes to conduct soil sampling without an approved plan in place, and because it assumes that EPA will approve abandonment plans instead of requiring the lagoons to be lined. If Respondents do not propose an abandonment plan that EPA approves, the lagoons must be lined. In accordance with Consent Order Paragraph 14, this is the schedule that EPA hereby approves, with a contingent lining schedule, for Bosma Lagoons 1, 2, and 3:

April 1, 2022	Respondent shall regrade the bottom of Lagoon 3 to facilitate drainage to at least two sumps with pumps that are constantly powered and functioning and set up to automatically detect and pump any water out of and away from Lagoon 3. Additional sumps will be added if water ponds between the sumps. Respondent shall maintain the sumps in place until Respondent receives approval from EPA to remove them. Respondent shall visually inspect Lagoon 3 daily beginning April 2, 2022, shall notify EPA within six hours if any liquid is observed accumulated in the lagoon, and shall take immediate action to empty the lagoon of liquid. Every monthly report shall summarize the frequency and results of these inspections.
April 15, 2022	Submit a single, unified abandonment plan for Lagoons 1, 2, and 3 that addresses the comments in this letter.
June 15, 2022	Discontinue use of Lagoons 1 and 2.
July 15, 2022	Remove manure liquids and solids from Lagoons 1 and 2.

If EPA *approves* the abandonment plan by July 15, 2022, then:

August 15, 2022	Complete deep soil sampling in accordance with the approved plan at Lagoons 1, 2, and 3.
September 15, 2022	Submit a Soil Borrow Source Plan that specifies all soil borrow sources

for backfilling the lagoons, how borrow sources will be sampled to ensure the soils are “clean,” and to ensure that no new earthen pits or holes are created on Respondents’ properties.”

December 31, 2022 Complete abandonments at Lagoons 1, 2, and 3.

If EPA *does not approve* the abandonment plan by July 15, 2022, then:

August 15, 2022	Complete geotechnical sampling at Lagoons 1, 2, and 3 to support lining the lagoons.
August 15, 2022	Submit draft lining plans for Lagoons 1, 2, and 3.
December 31, 2022	Complete lining of Lagoons 1, 2, and 3.

If Respondents do not address EPA’s comments on draft abandonment plans, or if Respondents do not demonstrate that the Bosma/Liberty Dairy will have adequate capacity for liquid manure storage without Lagoons 1, 2, and 3, EPA may disapprove the abandonment option for these lagoons and direct Respondents to begin preparation of a lining plan for these lagoons on an accelerated schedule prior to July 15, 2022.

You may contact me at (206) 553-6904, or your legal counsel may contact Jennifer MacDonald at (206) 553-8311, if you have any questions regarding this letter.

Sincerely,



Eric Winiecki
EPA Project Coordinator
Enforcement and Compliance Assurance Division

cc: Jennifer MacDonald
Don Clabaugh
Eric Weber, Landau Associates